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Non Invasive Imaging (Echocardiography, Nuclear, PET, MR and CT)

A NOVEL METHOD FOR ASSESSING INFLAMMATION IN ASCENDING AORTA BY F-18FLUORODEOXYGLUCOSE POSITRON EMISSION TOMOGRAPHY IMAGING IS HIGHLY REPRODUCIBLE

Poster Contributions
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Background: F-18Fluorodeoxyglucose (FDG) positron emission tomography (PET) has been used for qualitatively diagnosing vasculitis. However, there is no standardized method for quantification of vascular inflammation. We tested the reproducibility of FDG-PET in measuring aortic inflammation in patients with rheumatoid arthritis (RA). RA is a systemic inflammatory condition associated with increased cardiovascular risk.

Methods: We studied 10 non-diabetic RA patients (mean age 52.1 + 10.6 years, 80% female) who underwent FDG-PET imaging of the ascending aorta. All patients were on no carbohydrate diet for 24 hours and were imaged 90 minutes after FDG injection. The area of interest was defined as the region of the aorta beginning 1 cm above the origin of the left main coronary artery and ending at the aortic arch in transaxial view. Inflammation was measured as the mean of the maximal target-to-background ratio (meanTBRmax), defined as the ratio of the mean of the maximal standard uptake values (SUV) in the ascending aorta (meanSUVmax) and mean of the maximal SUV in either the brachiocephalic vein or superior vena cava, whichever was the lesser value (bckgrnd). Regions of interest in the aorta were hand-drawn and included the vessel wall. Regions of interest in the brachiocephalic vein or superior vena cava were a minimum of 3 pixels in size and 0.3 cm2 in area and measured the blood pool background. Each study was read by 3 experienced readers using MedView Software (MedImage, Ann Arbor, MI).

Results: Each meanTBRmax was derived from, on average, 10 independent transaxial slice measurements of the ascending aorta. Bckgrnd was derived from the average of 6 transaxial measurements. Interobserver correlation coefficients of reliability were calculated using ANOVA for meanSUVmax, bckgrnd and meanTBRmax, and were 0.997, 0.992 and 0.922, respectively.

Conclusion: We have developed a method for measuring inflammation in the ascending aorta for RA patients that is facile and highly reproducible. Using this method, FDG-PET can be used to monitor vascular inflammation in this population of patients.